II. AMENDMENTS TO THE CLAIMS

Claim 1. (Currently Amended) A method of screening a compound library or portion thereof by absorption, said method comprising:

(i) screening a primary library or portion thereof having a plurality of test samples containing isolated compounds or isolated mixtures of compounds per test sample by generating an *in vivo* absorption profile for each of said test samples from initial dose data and from *in vitro* bioavailability data comprising permeability and solubility data, and optionally dissolution rate and transport mechanism data from each of said test samples, wherein said absorption profile is characterized by one or more of rate of absorption, extent of absorption, and concentration of a test sample relative to a selected site of administration and a selected sampling site for one or more physiological barriers to absorption of a mammalian system of interest;

(ii) selecting compounds having ~~a desired~~ the absorption profile; and

(iii) producing a secondary compound library comprising the selected compounds, and optionally repeating steps (i) through (iii) one or more times, whereby said compound library or portion thereof is screened by absorption.

Claim 2. (Original) The method of claim 1, wherein said *in vivo* absorption profile is generated by providing said initial dose data and said *in vitro* bioavailability data to a computer-implemented pharmacokinetic tool (PK tool), wherein said PK tool comprises as computer-readable components, an input/output system, a simulation engine, and a simulation model comprising a physiological model of said mammalian system of interest, wherein said input/output system, simulation engine and simulation model are capable of working together to carry out the steps of:

(i) receiving through the input/output system as input data, said initial dose data and said *in vitro* bioavailability data for one or said test samples; and

(ii) generating as output data a simulated *in vitro* absorption profile for said test sample.

Claim 3. (Original) The method of claim 1, which further comprises: (iv) screening said secondary compound library by one or more properties in addition to absorption; (v)

selecting compounds by one or more of said properties, and (vi) producing one or more compound libraries characterized by absorption, and one or more of said properties.

Claim 4. (Original) The method of claim 3, wherein said one or more properties in addition to absorption is selected from the group consisting of metabolism, toxicity and activity.

Claim 5. (Currently Amended) A method of screening a compound library or portion thereof by absorption, said method comprising:

(i) screening a compound library or portion thereof having a plurality of test samples containing isolated compounds or isolated mixtures of compounds per test sample by generating a simulated *in vitro* absorption profile for each of said test samples from initial dose data and from *in vitro* bioavailability data comprising permeability and solubility data, and optionally dissolution rate and transport mechanism data for each of said test samples, wherein said simulated absorption profile is characterized by one or more of rate of absorption, extent of absorption, and concentration of a test sample relative to a selected site of administration and a selected sampling site of one or more physiological barriers to absorption of a mammalian system of interest, wherein said simulated *in vitro* absorption profile is generated by:

a. providing said initial dose data and said *in vitro* bioavailability data to a computer–implemented pharmacokinetic tool (PK tool) which comprises a s computer-readable components, an input/output system, a simulation engine, and a simulation model comprising a physiological model of said mammalian system of interest, wherein said input/output system, simulation engine and simulation model are capable of working together to carry out the steps of:

b. receiving through the input/output system as input data, said initial dose data and said *in vitro* bioavailability data for one or said test samples; and

c. generating as output data a simulated *in vivo* absorption profile for said test samples;

(ii) selecting compounds having ~~a desired~~ the absorption profile; and

(iii) producing a secondary compound library comprising the selected compounds, and optionally repeating steps (i) and (iii) one or more times, whereby said compound library or portion thereof is screened by absorption.

Claim 6. (Original) The method of claim 5, wherein said physiological model is a mathematical model of said mammalian system comprising as operably linked components: (i) differential equations for calculating solubility and absorption of a test sample for one or more physiological segments of the mammal system of interest; and (ii) initial parameter values for the differential equations corresponding to physiological parameter sand one or mores selectively optimized adjustment parameters, and optionally one or more regional correlation parameters, for one or more physiological segments of said mammal system of interest; and optionally (iii) control statement rules for one or more of absorption, permeability, solubility, dissolution, concentration, and mathematical error correction, for one or more physiological segments of said mammal system of interest.

Claim 7. (Original) The method of claim 1 or 6, wherein said permeability and said transport mechanism data is derived from a cell-based assay.

Claim 8. (Original) The method of claim 1 or 6, wherein said solubility and said dissolution rate data is derived from a chemical-based assay.

Claim 9. (Original) The method of claim 6, wherein one or more said permeability data is derived from structure activity relationship information of one or more compounds of said compound library.

Claim 10. (Original) The method of claim 6, wherein said solubility data is derived from structure activity relationship information of one or more compounds of said compound library.

Claim 11. (Original) The method of claim 6, wherein said dissolution rate data is derived from structure activity relationship information of one or more compounds of said compound library.

Claim 12. (Original) The method of claim 1 or 6, wherein said mammalian system of interest is selected from the group consisting of the gastrointestinal tract, the eye, the nose, the lung, the skin, and the brain.

Claim 13. (Original) The method of claim 1 or 6, wherein said compound library is selected from the group consisting of a natural library, a synthetic library, and a combinatorial library.

Claim 14. (Original) The method of claim 13, wherein said compound library comprises compounds of unknown biological activity.

Claim 15. (Original) The method of claim 2 or 6, wherein said physiological model is for a mammalian system selected from the group consisting of gastrointestinal tract, eye, nose, lung, skin, and blood brain barrier.

Claim 16. (Original) The method of claim 6, which further comprises (iv) screening said secondary compound library by one or more properties in addition to absorption; (v) selecting compounds by one or more of said properties, and (vi) producing one or more compound libraries characterized by absorption, and one or more of said properties.

Claim 17. (Original) The method of claim 16, wherein said one or more properties in addition to absorption is selected from the group consisting of metabolism, toxicity and activity.

Claim 18. (Withdrawn) A secondary compound library produced by the method of claim 1, 3, 6 or 16.